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Older adults are at a high risk for falls and diseases that can be prevented or controlled by achieving the recommended daily amounts of activity as outlined by the U.S. Department of Health and Human Services (2008). Despite this knowledge, older adults continue to be the least active demographic in the United States, not only placing them at higher risk for disease, but increased risk of falls and decreases in quality of life (Bean, Vora, & Frontera, 2004; Nelson, Rejeski, Blair, Duncan & Judge, 2007). The objective for this project was to implement a modified martial arts program for older adults over the age of 60, and determine its impact on physical performance measures and self-efficacy. Testing the working hypothesis that participating in a modified martial arts program increased strength, endurance, balance and self-efficacy of adults over the age of 60 achieved this aim. The approach to testing this hypothesis was to conduct a pre-post intervention study, where participants over the age of 60 were tested on the Sit to Stand, 8-foot Up and Go, Arm Curl, 4-point Balance Scale and Self-efficacy for Exercise Scale (SEE) before and after a 12-week modified martial arts program. The rationale of this research was based on preliminary findings that strongly suggested that martial arts programs have positive effects on participants, but studies had not fully addressed older populations or the modifications needed to make older adult training more effective. New findings in this regard provided further evidence of the effectiveness of a modified martial arts program in increasing the muscle strength, muscle endurance, balance and self-efficacy in adults over the age of 60. This project is significant in that it identified the extent to which martial arts training could be a safe, effective and engaging exercise opportunity, thereby encouraging greater participation in physical activity among older adult

THE EFFECTS OF MODIFIED MARTIAL ARTS ON OLDER ADULTS

by

Jennifer Ann Schachner

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Approved by

_____
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I dedicate this work to my parents, James and Karen Schachner, whom without their love, support and encouragement, I would have never been able to accomplish my dream of earning a doctorate.

I also dedicate this to three others whom made the curriculum and research possible: Adeline Tibbs, Bear Malick and Gayle Malick

I also wish to thank Greg Garcia and Michael Hathaway for all their support in this project.

APPROVAL PAGE

This dissertation written by Jennifer Ann Schachner has been approved by the following committee of the Faculty of The Graduate School at The University of North Carolina at Greensboro.

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CHAPTER I

PROJECT OVERVIEW

Older adults are the least active demographic in the United States, placing them at higher risk for age related disease and disability (Nelson, Rejeski, Blair, Duncan & Judge, 2007). Programs that aim to address barriers to exercise (such as poor fitness levels or lack of self-esteem) are vital components to increase activity in older adults. Daily activity can help protect against many medical conditions that can occur with aging such as diabetes, high blood pressure and dementia, yet as adults age their activity levels begin to drop (Watson et al., 2016). Approximately 25.4% of adults aged 50-64 report no physical activity outside of their normal routine. This rises to 26.7% for those 65-74 years of age and up to 35.3% for those over 75 (Watson et al., 2016).

Martial arts programs that are tailored to the needs of this population can be an effective way to break exercise barriers such as poor health, lack of education, lack of resources, poor self-efficacy, lack of motivation and many other social, emotional and cognitive roadblocks (Schutzer & Graves, 2004). Older adults, who are likely to experience age-related declines in physical, emotional and social health, may benefit from participating in martial arts programming as a potentially effective vehicle to improve functionality, quality of life and lower the risk of falls. However, in order to do this safely and effectively modifications need to be made to accommodate for decreases in balance and strength that can occur with age (Jones & Rose, 2005; Payne & Issacs, 2016; King, Rejeski & Buchner, 1998). Currently, limited research focuses on the potential benefits of martial arts training for older adults, and none emphasize the modifications needed to make practice safe and more effective for the older adult.

While research demonstrates the benefits that martial arts can provide for younger participants (Kim, Stebbins, Chai & Song, 2011; Falk & Mor, 1996: Lakes et al., 2013) there is a *critical need* to identify to what extent a modified martial arts programs can benefit the older adult.

Purpose Statement

My *long-term goal* is to expand martial arts curricula for older adults, by demonstrating their legitimacy and viability as effective older adult programs. My *objective* is to determine the extent to which martial arts training improves balance, strength, endurance and self-efficacy for older adults. The *central hypothesis* is that participation in a modified 12-week martial arts program will positively affect strength and endurance, balance and self-efficacy of adults over the age of 60. The *rationale* for this project is based upon preliminary findings that strongly suggest that martial arts programs have positive effects on adults physically, emotionally and cognitively, but none have fully addressed the older population or the modifications needed to make older adult training more effective. My specific objective is to:

Aim #1: Determine the extent to which modified martial arts training improves older adult endurance, strength, balance, and self-efficacy. My working hypothesis is that participating in a modified 12-week martial arts program will result in increased endurance, strength, balance and self-efficacy in older adults. This is based on limited preliminary data that indicates older adults will demonstrate improvements in balance, strength and endurance with participation in a non-modified martial arts program. It has also been demonstrated that increases in physical activity will increase scores on the Self Efficacy for Exercise Scale (SEE).

Review of Literature that is Relevant to this Project

Physical inactivity is a major risk factor for falls and debilitating diseases among older adults. According to the Center for Disease Control (2016), more then 25% of Americans over the age of 50 report getting no physical activity beyond their normal daily routine. This continues to make older adults the least active demographic in the United States, placing them at a higher risk for chronic disease and falls (Nelson, Rejeski, Blair, Duncan & Judge, 2007). Conversely, physical activity has been shown to increase balance, strength, endurance, flexibility and self-

efficacy in older populations, demonstrating a need for older adults to become more active (Nelson, Rejeski, Blair, Duncan & Judge, 2007; Hui & Rubensten, 2006; Lee, Arthor & Avis, 2008). Martial arts programs that take these challenges into consideration and provide knowledgeable, safe instruction may be the first step in breaking down the real or perceived barriers experienced by older adults. Since safe instruction is specifically listed by the Center for Disease Control as an exercise barrier for this population, it is important that programs address this issue (Watson, 2016); however, there continues to be limited available information on how to modify martial arts appropriately.

The martial art of Taekwondo (TKD), which focuses on kicks, punches and stances with no grappling or groundwork (as seen in mixed martial arts), can provide a basic framework to make curriculum modifications appropriate for older adults. TKD has been shown to provide increases in balance, flexibility and strength as well as improvements in cognition, self-esteem and self-confidence (O'Donovan, Cheung, Catley, McGregor & Strutton, 2006; Brudnak, Dundero, Van Hecke, 2002; Pons van Dijk, Huijts & Lodder, 2012). Emerging studies show the benefits of martial arts for the aging population. Strength, balance, endurance and flexibility have all been shown to increase with participation in Soo Bahk Do (SBD), which is a variation of TKD (Douris, Chinan, Gomez, Steffens & Weiss, 2004). While the ages of participants were wide (40-60 years), Douris et al. (2004) concluded that, when practiced regularly, SBD could combat the natural declines associated with aging and a sedentary lifestyle. Other research supports that strength and balance also can be increased with martial arts training (Pons van Dijk, Lessen, Leffers, Kingma & Lodder, 2013).

The double support phase of walking (where both feet are on the floor) is an important component in falls prevention as the longer people stay in this phase, the more likely they are to fall (Payne & Issacs, 2016). Practicing stances, like those in TKD, can decrease the time in the double support phase, suggesting that this would lead to a decrease in falls risk (Cromwell, Meyer, Meyers and Newton, 2007). Also important to balance and falls prevention are the changes that occur in overall postural stability. Decreases in postural stability that occur with age

lead to a decrease in balance and increased risk of falls. Martial artists have been found to have less of a decrease in postural stability then their less active counterparts (Krampe, Smolder & Doumas, 2014). Given that on average, older adults show decreases in all of these parameters (e.g., balance, endurance, strength, and self-efficacy) it is predicted that by participating in a modified TKD program, older adults can experience many of the same benefits as their younger counterparts.

Based on current literature, there is a clear critical *need* to increase activity levels in older adults and to identify to what extent a modified martial arts training program can meet their needs. With a majority of previous studies focused on younger participants, a study designed to meet the needs of the older adult and connect the training benefits of martial arts would provide a more solid foundation for this type of activity to be used in the future. Achieving positive effects from a modified Taekwondo program on strength, endurance, balance and self-efficacy would help to promote martial arts training for older adults as a safe and viable alternative exercise that could help to break exercise barriers and increase older adult activity levels.

Methodology and Approach

Description of Participants.

This study consisted of 18 male and female participants ranging in age from 60-91 years old. While the researcher was aware that many cognitive impairments may not always be evident or medically verified, the exclusion criteria included the presence of any verified medical or cognitive impairment. Individuals were not excluded based on physical challenges unless denied clearance from their physician. They were also not excluded based on current fitness level, however they must have not participated in martial arts for at least 10 years. A pre-screening questionnaire was administered addressing exercise history, current exercise behavior and overall activity habits (Appendix A). This helped to screen out participants that might have had current martial arts experience or flag-participants that had come into the program with high levels of fitness. Approval by the Institutional Review Board of University of North Carolina at

Greensboro occurred prior to subject recruitment and all participants submitted their written consent.

Procedures and Measures.

The class was held at a therapeutic exercise facility that caters to the needs of older adults and people with disabilities. Prior to recruitment and as part of the IRB approval process, written agreements were made between the researcher and the center as to the responsibilities of the researcher and the extent of the study. Recruitment of participants took place through various methods including the use of flyers, social media, word of mouth and the center's member email list. Those individuals who expressed interest in the study were contacted by the researcher via phone explaining the program and requirements. Upon determination that the participant had qualified, the consent, health history, and medical forms were obtained and participants were officially enrolled into the study (Appendix B).

The study consisted of a 12-week martial arts program that had been modified to meet the needs of the older population. Prior to beginning the program and immediately following the 12-weeks, fitness testing (including upper and lower body strength/endurance and balance) as well as a self-efficacy for exercise (SEE) survey was administered (Appendix C). Since the researcher was the class instructor, a research assistant performed and conducted the pre and posttests to eliminate any type of bias in the classroom. The researcher did not have access to the pre test scores until after the posttests had been conducted.

Each class session lasted 55-60 minutes and consisted of approximately 10 minutes of warm up and stretching, 15 minutes of basic techniques such as blocks, punches, strikes and kicks, 10 minutes of pad conditioning, 15 minutes of Poomse and 10 minutes of cool down. Poomse is a "pre arranged sequence of movements" helpful in teaching balance, coordination and control (Glass, Reeg & Bierma, 2002). Some of the modifications included having the subject participate seated or using a chair for balance, changing the angles of attack and strikes to put less stress on the joints, changing movement patterns to eliminate crossing the midline of the

body (grapevine, cross step etc.) and in some cases eliminating the movement completely from training. Other modifications included using knee strikes instead of full kicks and smaller steps when attempting 360-degree turns.

Senior Fitness Test.

Components of the Senior Fitness Test Manual were used to assess strength and endurance**.** The 30-second chair stand, arm curl, 2-minute step test and 8-foot up and go were conducted before and after the 12-week program. Tests were chosen based on their ability to assess functionality across a wide range of ability levels as well as their relative safety for subject participation (Jones & Rose, 2005). As field-tests, they were also chosen for their ease of administration in a group setting. Each test has continuous scale scoring allowing the researcher to use both norm and criterion referenced scoring. Tests have been found to have high general reliability and after evaluating each individual fitness test, both content and construct reliability was scored high (Rikli & Jones, 1999).

Each test evaluated a specific component of functional fitness. The 30-second chair stand measured overall leg strength and endurance (Jones & Rose, 2005). The participant was instructed to sit and stand up and down as fast as possible, each time making sure that they made contact with the chair in the sitting position while not using their hands to push up out of the chair. The higher the number of repetitions of sit-to-stand, the stronger the indication of leg strength. The arm curl was a measure of upper body strength and endurance (Jones & Rose 2005). Participants performed this exercise in the seated position. Per test protocol, men were given an 8 lb. weight and women were given a 5 lb. weight. They were asked to choose their dominant arm. Participants then performed as many bicep curls as they could in 30 seconds. As with the chair stand, the higher the number of arm curls, the higher the indicator of upper body strength. The final test was the 8-foot up and go. Participants begin in a seated position. There was a flexible cone placed 8 feet from the front legs of the subject's chair. When indicated to "go" a stopwatch was started and participant got up from chair, walked around the cone as quickly as possible and then sat back down. Once the subject reseated, the stopwatch was stopped. Their

time was an indicator of falls risk and basic functional agility. In this test, the lower the number of seconds indicated a positive test result.

For endurance, a 2-minute step test was used. Participants were asked to march as quickly as they could for 2 minutes. Each time their right leg reached the specified height; the evaluator counted one repetition. The total number of times that the right leg was raised to the correct height indicated the number of steps taken in 2 minutes. This number was the recorded score. Test protocol required that the leg of the participant was measured and that a mark was made on the wall next to the participant. The mark was made at the height that was equivalent to half the length of the femur of the participant. If the knee of the participant did not reach that mark, that step did not count to the total number of steps taken in 2 minutes. The higher number of steps indicated a higher endurance level.

As part of the physical tests, participants performed the 4- Stage Balance Test. This is a four part progressive test. Participants were asked to first start with their feet together and with their eyes open and hold this position for at least 10 seconds. If the subject held that position for 10 seconds, they progressed to the second stage. In stage 2, the instep of one foot was placed so that it was touching the big toe of the other foot. The subject was then asked to hold that position for 10 seconds. As with the first stage, the subject moved on to the next level if they could hold that position for 10 seconds**.** For the third stage, the subject stood with one foot in front of the other. If balance was held in this position for at least 10 seconds, participants progressed to the fourth and final stage. In stage 4, participants were asked to hold this position for as long as they could until 2 minutes. The participant who progressed the furthest in these stages had the higher balance scores and were at a lower likelihood for falls and falls related injuries.

Self-Efficacy for Exercise (SEE).

Participants were also asked to fill out The Self Efficacy for Exercise (SEE) survey both before and after the 12 weeks. This inventory was designed by Resnick and Jenkins (2000) to specifically measure self-efficacy in the older adult population. It was chosen because it is a short questionnaire (9 items) and had been demonstrated to be appropriate for use with older adults as

well as both the African-American and Latino-American communities (Gleeson-Kreig, 2006; Harnirattisai & Johnson, 2005; Resnick et al., 2004). It has also demonstrated a good internal consistency of 0.92 (Resnick and Jenkins, 2000). At the end of the 12 weeks, the participants again filled out the SEE inventory to see if there were any changes as a result of program participation.

Throughout the 12-week period, other data were collected, to enrich and inform interpretation of primary data. The researcher kept a daily journal in which classes were chronicled so that each week the researcher could note appropriate progressions and modifications thus helping to guide the curriculum. After each session, the researcher reflected on the positive and negative outcomes of that particular session. Unsolicited feedback was also collected from the participants throughout the program to help make the program specific to their needed. Periodically and when appropriate, the researcher also videotaped and photographed a class session so that she could go back and review the class protocols, student progress and lessons. Permission for videotape and photography was given via subject consent form and IRB permission.

Analysis of Data and Findings

The study consisted of 18 participants. The average age of the group was 70.5 years (SD=8.62) with 13 females and 5 males. While all 18 participants were able to complete the pre test, only 17 completed the posttest. One subject suffered a major injury outside of the class and was unable to complete the post testing in a reasonable timeframe. The participant was able to complete the 12-week session as the injury occurred after the last class session, but before the posttest appointment. There was a 100% retention rate with none of the participants dropping out of the 12-week program. The average group attendance was 20.38 (SD= 5.0) sessions out of 24 giving an overall group attendance rate of 89%.

Individually all participants (N=17) either improved or stayed the same across all testing parameters. Using the SPSS statistical software Version 22, and the Hedges g for effect size calculations (Lakens, 2013), the researcher was able to determine the following. The group, on

average improved in all areas. For the step test the average rose from 53.89 (SD= 29.44) to 75.82 (SD= 26.59), t(16) = 3.26, p= 0.001, Hedges g = 0.68. The chair stand averages increased from 10.23 (SD=4.07) to 13.94 (SD = 3.91), t(16) = 5.50, p= 0.001, Hedges g = 0.91 while the arm curl group means increased form 15.56 (SD=29.44) to 19.47 (SD=4.74), t(16) = 4.25 p= 0.001, Hedges g = 0.95. For the 8 foot up and go, the average times decreased from 10.83 seconds (SD=11.07) to 7.04 seconds (SD=3.73), t(16) = 9.78, p= 0.001, Hedges g = 0.99, indicating a positive result with medium to large effects sizes.

The scores for the 4-Point Balance Scale showed statistical significance with a moderate effect size (t(16) =1.6, p = 0.14, Hedges g = 0.65). Each test was scored on a scale of 1 to 4. A score of 1 indicated the lowest score and highest risk of falls while a score of 4 indicated the highest score and lowest rick for falls. Ten participants scores did not change. Two participants who had a score of 4, six people who had a score of 3 and two people that had a score of 2 showed no change in level. Two participants actually dropped from 4 to 3. Five people showed improvement by raising one category. Two people jumped from level 2 to level 3. Two people jumped from level 3 to 4. One person jumped from level 2 to 4 showing the largest change by an individual.

Even though 3 of the participants showed decreases in SEE scores, the overall average went from 55.5 (SD=20.94) to 61.18 (20.13), t(16) = 0.99, p= 0.35, Hedges g = 0.29 indicating a very slight increase in self-efficacy with a small effect size. Three participants verbally indicated to the research assistant that they did not fully understand the questions and therefore were not sure how to answer, these same participants showed a decrease in self-efficacy scores. Even though there was not statistical significance, there was some effect.

Throughout the course, participants provided feedback to the researcher. While this was not a requirement, most members felt it appropriate to give feedback at the 4,8 and 12-week mark. Common themes seen in the 4-week feedback were feelings of peace and increases in strength. Members indicated class enjoyment in terms of how the class was paced as well as the camaraderie of the group. Many also indicated that the class was free of judgment and a place

where they felt at ease to try new things. It was here that the researcher also began to visually see a change in the refinement and ease of the individual movements.

The 6-week feedback also included further feelings of increased strength, endurance and agility. Themes of increased balance also began to emerge in the member feedback. One participant specifically indicated that she was less depressed, sleeping better and had a better grasp on her PTSD symptoms. Others indicated that they were “less out of breath” as they took each class. While the researcher continued to journal the progress of the members, it was visually apparent that the participants were catching on to the movements faster and more efficiently. By week 12, all participants who provided written feedback over the course of the 12 weeks (N= 8) indicated that they felt stronger, more balanced, and safer. They also indicated that the exercises were easier to perform and learn and caused less pain during execution. Most were using the chair or wall less often for balance. This was both verbally stated by the participant and observed by the researcher.

In the posttest questionnaire, 94.4% indicated that the sessions increased their knowledge overall, that they generally enjoyed the class and would recommend the class to others. Ninety four point four percent also indicated that they felt their individual needs were taken into consideration and that they now consider themselves martial artists. When asked if they would change any part of the program 72.2% said no. The other 22.2% said yes they would change something about the class, but the only thing they all would change would be the class time. Eighty eight point nine percent indicated that they would take the class again if it were offered for free and 83.3% said they would take it again if there were a small fee.

Discussion

Hedges g was chosen to measure effect size as it has been deemed most appropriate for looking at the magnitude of change in a smaller group. All the tests, except for the SEE showed statistical significance between pre and posttest ($p= 0.05$). A 12-week program may have not been long enough to show any changes in self-efficacy therefore further investigations may need to be completed with longer timeframes to fully address self-efficacy changes with modified

martial arts and older adults. The self-efficacy effect size for this group was medium at 59%. There was confusion reported from the participants when completing the SEE scale. Participants verbally expressed that the statements were not clear and therefore some of those answers may not have been completely accurate. Further studies may want to use a different scale to measure self-efficacy with this population or find a better way to explain the test without influencing respondent's answers.

The balance inconsistences and a lower effect size (although medium) could be attributed to numerous individual factors including but not limited to chronic disease that my effect balance and vestibular systems, time of day and whether or not the participant had exercised before or after the posttest. Performing the sit to stand and 8 foot up and go may have adversely affected the balance scores and further consideration should be taken regarding order of pre and posttest exercises.

Sit to Stand, 8-foot Up and Go, Arm Curl and the Step Test all showed statistical significance and acceptable effect sizes. The 8-foot up and go and the chair stands, which measure both agility and leg strength showed the largest effect sizes. This would indicate that the stance work and walking patterns along with the modified kicking may be effective in increasing both leg strength and agility in this population. The arm curl showed statistical significance and a large effect size at 84%. The punches and blocks used in this study may have provided enough movement to increase arm strength over the 12-week period.

Implications for Professional Practice

While the sample size was small for this study there are some important implications for professional practice in a variety of areas as a result of the findings for senior exercise programs and martial arts curriculum. The aim of this overall study was to determine the extent to which modified martial arts training improves older adult endurance, strength and balance, and self-efficacy. While this study was exploratory in nature due to the small sample size, acceptable p values and effect sizes do suggest the benefits that this type of training may have on the larger population of older adults. The lack of documented injuries during class and the high retention

rate indicate that the exercise modifications probably had some relationship with preventing injury for this population. This study may provide a framework for future senior martial arts curriculum that is safe and positively affects participant adherence. With proper modifications and a well-educated instructor in older adult fitness and martial arts, selected older adults appear to benefit from an appropriately designed martial arts curriculum. Further research to support this curriculum will affect the credibility of the curriculum as well as the credibility of the program. For example many believe that martial arts can be harmful to an older adult. Research that indicates otherwise even on a smaller scale could open up further scientific and evidence based studies on more martial arts benefits for older adults. Many martial arts instructors may be looking for a more systematic approach to training and would like to have a curriculum to follow with measured results leading to increased validity and safety of the program.

CHAPTER II

DISSEMINATION

The first step in utilizing and disseminating this research is to begin presenting the findings to martial artists and kinesiologists of all ages and skill levels. While conferences and seminars on aging and exercise can be easy to find, that is not the case with martial arts. After searching internet databases, social media, academic newsletters and speaking to various members of the martial arts community, it was decided that that this presentation would be submitted to the UCLA Martial Arts and Wellness Symposium.

This is not simply a martial arts seminar, it is a conference that is designed to "increase awareness and understanding that martial arts is a valuable resource for becoming, staying and thriving as a healthy human being." In looking at the target audience, it appears that the participant backgrounds will vary from all academic levels, martial arts skills and ages. This conference is associated with the UCLA Martial Arts club and is aiming to increase martial arts education in academia and research. Based on this one can assume that the target audience will primarily range from students in kinesiology, students in martial arts, and professors to martial arts instructors from all styles and concentrations. This group is important because it is difficult to find martial arts conferences that focus on the academic aspect of training.

The presentation will include all the components of the program that was completed in Chapter 1. The main objective of the presentation is to share the theoretical and applied framework so that all levels of academic personnel and martial artists will consider the validity of older adult martial arts programming. There will be three goals of this presentation: First is an explanation of how martial artists can help the older population including the barriers or challenges that older adults face during activity. Second is demonstrating modifications that can be made to existing programs allowing for older adult participation. The third is explaining the

data related to first two goals in support of the credibility of the work and demonstrate the usefulness of the modifications. The challenge for this presentation will be to walk a fine line between speaking to martial arts instructors and speaking to those who are familiar with senior fitness.

In order to achieve these goals, videos and photos will need to be included. These visuals will help the audience see the reality of the participants as well as the applications of the movements. The use of these videos and photographs has been approved by IRB through UNCG. The following is an outline that will be used in developing a PowerPoint presentation to be delivered at the UCLA Martial Arts and Wellness Symposium in June 2018.

Referenced Perspective/Theoretical Framework

Traditionally people who were not considered physically superior (older adults, children and those with disability) were not considered strong enough for martial arts training (Park, Park & Gerrard, 1989). The origins of most martial arts stemmed from war and to protect oneself and one's family so only the physically elite were trained for battle. In modern-day society, martial arts has shifted from a focus on fighting and war to a focus on improving overall health and well-being. This seminar is one of the first of its kind in the United States to focus on martial arts as a vehicle to promote wellness through training. While there has been a shift in thought about the importance of martial arts for health and wellbeing, there is still lacking solid research and training programs for older adult martial artisits. From health challenges to issues associated with ageism, many barriers can keep older adults from activity and marital arts participation (Gryffin, Chen, Chaney, Dodd, & Roberts, 2015). Barriers for seniors in martial arts may include lack of instructor education, exercise modification and role models. This seminar will aim to provide instructor education and awarness on how to teach older adult martial art programs.

Presentation Details

The following sections will be outlined by topic. References to the specific PowerPoint slides will be made (see appendix for complete PowerPoint). This section is written in first person, as it is a speech to accompany the attached PowerPoint (Appendix D).

Introduction (Slides #1 and #2).

Good Afternoon, my name is Jennifer Schachner. It is a pleasure to be a part of the UCLA Martial Arts and Wellness Symposium. Before we get started, I would like to give you a bit of background as to how I came into this project. I have been training in Taekwondo for almost 30 years and I have a 5th Dan black belt in Taekwondo. In 2017 I earned my title of Master Instructor and currently teach a program in San Jose, CA entitled Inclusive Martial Arts. I have a BS and MA in Kinesiology from San Jose State University and am in my final year of a doctoral program at University of North Carolina at Greensboro. All of my degrees have focused on adapted martial arts. I also have multiple fitness certifications that cater to the needs of older adults and special populations. I have come here to present my work on older adult participants and the benefits of modified martial arts for this population. I met some great people in my life that struggled to continue to train due to disability or age and there was no resource for their instructors to go to for help. Having worked in falls prevention for many years, I saw how a lack of knowledge and resources contributed to increases in falls among older adults.

Background on Older Adults (Slide #3 and #4).

Older adults are the least active demographic in the United States, placing them at higher risk for age related disease and disability. This inactivity is also the number one risk factor for falls in this population. Programs such as martial arts that aim to address barriers to exercise are vital components to increase activity in older adults. Daily activity can help protect against many medical conditions that can occur with aging such as diabetes, high blood pressure and dementia, yet older adults are not moving due to various challenges, including but not limited to poor health, lack of education, lack of resources, poor self-efficacy, lack of motivation and many other social, emotional and cognitive challenges. Martial arts programs that tailor to the needs of this population can be an effective way to break exercise barriers and increase the activity levels of those who are aging, in turn increasing activity and decreasing falls risk. Enhanced self-esteem and increased fitness levels have been demonstrated with younger participants, but not much has been studied in our aging populations. Older adults, who are likely to experience age-related

declines in these areas, may also benefit from participating in martial arts programming to improve functionality and quality of life. However in order to do this safely and effectively modifications needs to be made to the training to accommodate for decreases in balance and strength that can occur with age. Most of our arts claim to train the entire person in mind, body and spirit and seniors can benefit from this training.

Martial Arts Benefits (Slide #5 & #6).

As most of you probably already know, martial arts training can provide increases in strength, endurance, agility, balance and self-efficacy. Self-efficacy is essentially ones confidence in completing a specific task. We have the literature to show the benefits in all of these areas for younger participants, but up until recently we were lacking the research on how each of these components can be improved for older adults. What are the martial arts benefits for those participants who are over 60 and how do we go about teaching this age group in a safe and effective manner? This is where I started to question what could be done with seniors and how to do it. I eventually narrowed down my research aim to "Determine the extent to which modified martial arts training improves older adult endurance, strength, balance and self-efficacy."

Program Structure (Slide #7).

The framework of my program was modeled from an evidence based fitness program called EnhanceFitness. As a master trainer for that program, I was able to use the structural components and the fitness assessments as a base to help design a modified martial arts curriculum. The program consisted of two classes per week for a total of 12 weeks. Pre and post testing was conducted a week before and a week after the session (we will see those in the upcoming slides). Each class lasted 55-60 minutes and was held in a large gym. Chairs, canes and walkers were used for the participants throughout the classes as needed. The class structure was 10 minutes of warm up and flexibility, 15 minutes of basic techniques, 10 minutes of pad conditioning, 15 minutes of forms and then 10 minutes of cool down. There was a simple bow in and a simple bow out and there were no uniforms or belts used in this program. After the second

week, one of the members had t-shirts made for the class out of enthusiasm for the program (you will see those later in the slides).

Pre and Post Tests (Slides #8 through #15).

Components of the Senior Fitness test were used to develop a base in which to (hopefully) see improvements after the 12 weeks. We also used a 4 Point Balance Test and a Self-Efficacy for Exercise Scale. It was important to me to not only test the exercise components, but also look at balance. Having been an active member of the Falls Prevention Task force of Santa Clara County, helping people maintain balance and avoid falls related injury is very important to me. For all of these evaluations, I was lucky enough to have a research assistant. I did not see the pre tests prior to the start of the program. I did not want to know anyone's results so that I would not consciously or sub consciously treat any student differently. I actually did not see any of the tests results until after the posttests were completed. I would like to briefly explain the tests so that as we discuss the results everyone can see how these tests work.

These tests were chosen based on their ability to assess functionality across a wide range of ability levels as well as their relative safety for subject participation. As field-tests they were also chosen for their ease of administration in a group setting. Let us start by looking at the 8 foot up and go. As you can see here in this slide (slide # 9) the participant starts by sitting in a chair. A cone is set up 8 feet away from the chair. The person is then asked to stand up and then walk (the key here being walk) around the cone and sit back down as quickly as possible. The time it takes (in seconds) to get up from a seated position, walk 8 feet around a cone and return to the seated position is their score. This test is commonly used in assessing balance and agility. The quicker someone can perform the task, the less likely they are to fall. Those that needed walkers or canes were allowed to use them and that was noted in the chart.

The 30-second chair stand (sometimes called Sit to Stand) is a direct measure of leg strength. A participant is asked to sit down and then stand back up as quickly as possible in 30 seconds. The amount of "sit to stands" that they preform in that time is their overall score. The higher number of repetitions, the higher the score and higher the leg strength. It is also a

measure of falls risk. The higher the number, the less likely someone is to fall. In fact this test was used in Santa Clara County as the “Sit to Stand Challenge.” Much like the ice bucket challenge a few years ago, organization and individuals throughout San Jose, challenged each other to do this. This video here is of a group of students performing this test for this challenge (slide #10).

In trying to assess multiple components, I also wanted to look at arm strength; therefore we used the arm curl test. Men were asked to lift an 8-pound weight while women were asked to lift a 5-pound weight. As with the Sit to Stand, the Arm Curl consisted of how many arm curls (bicep curls) the participant could complete in 30 seconds. The higher repetitions indicated higher arm strength in the participant (slide #11). The last test taken from the Senior Fitness test was the Step Test. A participant was asked to stand near a wall where the research assistant would then measure the length of from their hip to their knee. A piece of tape was put on the wall to show how high the participant should step. The number of full steps completed in 2 minutes was the score for this test. Here we were measuring endurance (slide #12).

The last physical test that was conducted was the 4-point balance scale. Each subject was asked to perform 4 balance tasks that increased in difficulty. As you can see form this slide the first task is relatively simple in terms of balance. As each level was achieved, the participant received one point. At the end of the test, the most points that could have been awarded were 4. It was chosen for its ease of use and applicability to the community and group class setting. It is simple and cost effective, as it only requires a stopwatch to administer. It has also been adopted by both the Otago and the STEADI falls prevention programs, which are evidence based programs supported by the Centers for Disease Control (slide #13 & #14).

Participants were also asked to fill out The Self Efficacy for Exercise (SEE) survey. This inventory was designed by Resnick and Jenkins (2000) to specifically measure self-efficacy in the older adult population. It was chosen because it is a short questionnaire (9 items) and has been demonstrated to be appropriate to use with older adults. This slide (slide # 15) shows you an example of the questions. They were all on a scale of 1-10. At the end the highest score would total 90 points, the higher the score the higher self-efficacy demonstrated from the participant.

Modifications (Slides #16 through #20).

So now that I told you all about the test, you are all probably wondering what we really taught the participants. The key word for all of this work is “modified.” I read study after study that discussed the participants and results, but none outlined the modifications used. What I was able to do is take my basic curriculum and start where I would start with any student. Regardless of the martial arts style, most of us use some sort of blocks, kicks, strikes and patterns in which we base our training. While my modifications are specific to Taekwondo, the shared variation of these moves can be easily adapted to the other styles. As we go though some of these slides, I encourage you to think about how you may make some of these changes for your own styles and techniques if necessary.

As you can see here in this slide (slide #16), many of the modifications started simply by doing the moves from a chair. The punches and blocks are probably the easiest modification that can be made. The only challenge is that you tend to lack hip rotation and rely a bit more on arm and core strength. Kicks can be started in a chair as well. In fact at times we kicked from the chair to help all the students learn the chambers before we moved on. It is interesting to note the first few classes almost everyone either used the chair while sitting or for balance. By the end of the class almost everyone was on the other side of the gym away from the chairs kicking and punching back and forth the floor. You will see a video shortly which demonstrates this.

Footwork was the one place that the participants varied the most in terms of physical ability. The level of balance was from one extreme to the other. We had some participants that really needed to perform from the chair and others that needed no assistance at all. I think we take for granted our balance when we are younger and especially when we train. Things that seem very simple such as a 90 degree turn proved to be much more difficult then I realized. I ended up breaking down the 90-degree turn into much smaller steps instead of one swooping motion. As you can see here from the diagram (slide #17), it allowed more stability through a slower action. This was the first step in teaching this move to many of the students, but by the end most had abandoned the smaller step for the full rotation. The other thing we needed to do

was eliminate any movements that crossed the midline of the body. Cross steps were replaced with just steps and step-ups when needed (as you can see in the photo here).

As you can see in this slide (slide #18), the modifications for the front kick (as we call it in Taekwondo) are varied. Some kicked from the chair, some kicked by using the wall, others kick using the chair and others simply did not need the modifications. For those that had knee or back issues, the knee strike was used as a modification. This was also a way that participants felt more comfortable when attempting to kick without assistance. They were able to throw the knee strike only and it helped to build their balance and confidence before they would throw the full kick.

The side and the round kick were a bit more challenging as they involved more hip motion and sitting in a chair made that a bit difficult. Some used the chair and did shorter kicks seated while those with extreme balance issues did a ridge hand upper body technique that mimicked the angle of attack of a round kick. (slide #19). These techniques could also be performed using a chair or wall for balance and participants kicked at a height that was comfortable for them. For some their feet were only a few inches off the floor but as long as they were doing proper and safe technique it really did not matter.

I would like to share with you a video (which I do have IRB permission from UNCG to share) before we discuss forms or Poomse (slide #20). Now that you have seen the class perform Palgae 1, I would like to ask how long you think it took to learn all of those moves? How long does it take your younger students to learn these moves? …… Ok, so this was taken on the last day of class (12 weeks) and it took the entire 12 weeks to get to this point. By week 6 we had only learned 8 of the 20 movements and I thought for sure we would never make it through the entire thing by the end of the session. Of all the things that I was prepared for in working on this class, I was not prepared for the learning curve for forms. It was evident throughout this process that as we age, it takes longer for us to memorize and learn movement patterns. After taking almost 2 weeks for the participants to learn only 4 moves, I almost abandoned that part of the curriculum all together. They were frustrated, I was frustrated, but I wanted to push on and see what happened. I was surprised to see almost a “switch” turned on after week 8. I don’t know if

the material was finally “clicking” or the participants were fired up and determined, but we did more from week 8-10 then we accomplished in the first 8 weeks alone. Ok so why is this a big deal? As an instructor we have to take into consideration the entire body including the mind. When we work with younger ones and they don’t remember the material we sometimes relate that to their work ethic and think they are not trying enough. In this case, it is not true, we have to remember that older adults learn at a slower pace sometimes and we need to have patience with them and teach them to have patience with themselves.

This group loved to hit the pads (and sometimes hit each other with them). There was not too many modifications needed with the pad work other then being very conscious of that fact that as people age their skin becomes much more frail. As apposed to having participants hit as hard as they can, we allowed them to “tap” the pad if they wanted or simply not hit it at all. If I were to do a study like this again, I would provide padded gloves for the participants. I highly recommend the use of padded gloves when using pad striking for this population.

Participant Journals (Slide #21 and #22).

Throughout the class, I kept a journal to document what I did in class each day, how the students reacted and what did and did not work. It was extremely helpful to look back on and see how I progressed as an instructor and the process of the curriculum. What I did not expect was that the students would voluntary send me their own journals and success stories that came out of the class. Here are just a few of the quotes that came from the student feedback.

Results (Slide #23).

We had 18 people participate in the program, but only 17 were able to complete the pre and posttest. One of the members suffered an injury the day after the class ended and could not complete the posttest in a reasonable amount of time. There were 13 women and 5 men with an average age of 70.5. There was a 100% retention rate with an average group attendance rate of 89%.

We used SPSS statistical Software Version 22 and the Hedges g for effect size calculation due to the small sample size. As you can see from the slide (slide #24), the group, on

average improved in all areas. For the Step Test the average rose from 53.89 (SD= 29.44) to 75.82 (SD= 26.59). The Chair Stand averages increased from 10.23 (SD=4.07) to 13.94 (SD = 3.91), while the arm curl group means increased form 15.56 (SD=29.44) to 19.47 (SD=4.74). For the 8- foot Up and Go, the average times decreased from 10.83 seconds (SD=11.07) to 7.04 seconds (SD=3.73), indicating a positive result. The effect sizes are also shown here and most were either medium or large effects.

The scores for the 4-Point Balance Scale showed statistical significance with a moderate effect size ($t(16) = 1.6$, $p = 0.14$, Hedges $g = 0.65$). Ten participants scores did not change. Two participants actually dropped from 4 to 3. Five people showed improvement by raising one category. Two people jumped from level 2 to level 3. Two people jumped from level 3 to 4. One person jumped from level 2 to 4 showing the largest change by and individual.

There were slight challenges with the SEE scores overall. A few of the participants had challenges understanding the questions and how or what to answer. They indicated verbally to the research assistant that they were confused in what to answer. Even though 3 of the participants showed decreases in SEE scores, the overall average went from 55.5 (SD=20.94) to 61.18 (20.13), $t(16) = 0.99$, $p= 0.35$, Hedges $g = 0.29$ indicating a very slight increase in self-efficacy with a small effect size.

Post Class Survey (Slide #25).

Included in this slide are the questions asked during the posttest and the group responses. As you can see, 94.4% indicated that the sessions increased their knowledge overall, that they generally enjoyed the class and would recommend the class to others. Ninety four point four percent also indicated that they felt their individual needs were taken into consideration and that they now consider themselves martial artists. When asked if they would change any part of the program 72.2% indicated “no”. The other 22.2% indicated “yes” they would change something about the class but the only thing they all would change would be the class time. Almost 89% said that they would take the class again if it were offered for free and 83.3% said they would take it again if there were a small fee.

Conclusion/Discussion (Slide #26 & #27).

So why does this all matter? This study suggests that a modified martial arts program is a safe and effective type of activity for the older adult population. By demonstrating the potential benefits of the training and sharing this work with you, my hope is to break some of the exercise barriers, by showing that the program can be safe and effective for the older adult population. Our findings provided further evidence of the effectiveness of a modified martial arts program in increasing the muscle strength, muscle endurance and balance in adults over the age of 60. This can lead to many future possibilities such as a longitudinal study examining the lifelong practice of martial arts. What this does for martial artists is to expand our reach in teaching and in some cases may actually increase our business financially. What I have presented to you today is information to inform and help our community be open-minded. It is not meant to be a full curriculum. In the near future, there will be an official and/or a “hands on” guidebook for martial arts instructors as to how they can teach older adults safely and effectively. Thank you for your time and consideration and please let me know if you have any questions. For your information, this final side (slide #28) provides all the references for the presentation today.

Significance and Professional Outcome

The significance and professional outcome is related to my long-term career goal of expanding health and wellness programming for older adults by increasing the availability of alternative programs such as martial arts and showing their validity and viability as an effective older adult program. Since this study did suggest that a modified martial arts program is a safe and effective type of activity for this population, it will provide yet another option for older adults and show the martial arts community that older adults can benefit from this type of training. By demonstrating the potential benefits of the training via community and academic presentations, it can help to break some of the exercise barriers, by showing that the program can be safe and effective for the older adult population. Over all, positive findings provide further evidence of the effectiveness of a modified martial arts program in increasing the muscle strength, muscle endurance and balance in adults over the age of 60, leading to many future possibilities such as a

longitudinal study examining the lifelong practice of martial arts or a “hands on” guidebook for martial arts instructors as to how they can teach older adults safely and effectively.

CHAPTER III

ACTION PLAN

For many years the world of martial arts was based on movements and exercises that were passed down from generation to generation. As a martial artist and Kinesiologist, it is important for me to use best practices in all of my class and to educate martial arts instructors. Many instructors in both kinesiology and martial arts may not realize that their traditional practices are no longer safe or appropriate for certain populations. While this research may provide new and innovative approaches to teaching martial arts to older adults, it also directly helps the older adult community. While the presentation outlined in Chapter 2 is a start to educating both Kinesiologists and martial artists, further work will need to be done in order to take the outcomes out into the community.

The action plan consists of multiple steps encompassing both short term and long-term goals leading to educating the community about the benefits and practices of martial arts for older adults. The first step has been to write a detailed outline for a presentation that can be used across multiple disciplines and altered to fit various themes and audiences. The goal with this presentation is to spread the work and word to the academic community across many disciplines, including but not limited to: kinesiology, gerontology, social work, and nursing. There exists speaking engagement opportunities that would allow for a broader audience who may not have a fitness or older adult background. An example of this would be the annual CHAMPS seminar in San Jose, CA. This seminar is multidisciplinary and aims to increase awareness in senior health, wellness and quality of life.

The next logical step in this process is to use the presentation as an outline to write a paper for submission to an academic journal. At this time there are various places in which a paper of this topic could be submitted, including but not limited, to The Journal of Aging and Physical Activity, The Journal of Aging and Health and The Journal of Physical Activity and

Health. There are also marital arts specific journals such as The International Journal of Martial Arts and Martial Arts Studies Journal. All would be good options for future submissions.

All of this work, including the original project is part of the larger and longer-term goal of writing a curriculum and certification program for martial artists who want to teach older adults. Much like the fitness industry experience in the early 1990's, the martial arts industry is beginning to see the need for further certification processes beyond having a black belt. Standards are being raised in the industry and the potential consumers are looking for more experienced and educated instructors. Much like a Kinesiology degree can be a good starting point for someone who wants to be a personal trainer, rarely are they hired at fitness clubs with a degree alone. Industry standard requires some additional certification. This should also become part of the best practices for martial arts. A black belt alone should not simply qualify an instructor TO instantly have the knowledge to teach everything and everyone. A senior martial arts certification would provide additional training to work safely and effectively with the older population.

This curriculum should cover multiple topics starting with some of the most basic fitness principles for seniors, social and emotional barriers, contraindications to martial arts and fitness movements and an outline of the modifications. As part of this certification process, a section will be included that will have the student instructors practice what it feels like to have many chronic conditions that are common to the older adult. Utilizing special eyeglasses to mimic vision problem, beans in the shoes for foot issues and various tapes and braces to simulate limited movement will be incorporated into the certification. This will be done to help the instructor understand the potential challenges of someone who is aging and losing physical abilities. It will also aid that instructor in modifying his or her own martial arts style by practicing in this restricted environment. The overall goal of the certification process will be to present a well rounded curriculum that focuses not only on the older adult, but to also show the instructors how to effectively and safely teach this population.

This project itself is a long-term goal that consists of multiple small projects to make this certification credible and industry worthy. This first part will be to determine the learning outcomes

and goals specific to the program. These outcomes will need to be determined before the actual curriculum is written and developed. These goals will drive and focus the certification material. Once the curriculum is written and organized, manuals will need to be developed as well as a determination of whether or not the project will be delivered in person or online. Manuals will consist of full color photos and explanations. Either way a website will be designed for the certification process and have multiple levels of material available to the instructors who wish to be certified. There will be video lessons, demonstrations and references included. Recertification requirements and goals will need to be determined and assessed as well. As the certification package is completed it will then need to be marketed and a price point will need to be determined.

The entire point of this project was to raise awareness of older adults in martial arts. The original project has set forth in motion a series of projects that will, when implemented correctly, lead to the education of older adults and generate best practices for martial arts instructors. For those instructors who wish to teach martial arts to senior students, there will be a resource available to give them the additional skills needed to be a better martial arts instructor when working with this population.

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APPENDIX A

PRE SCREENING QUESTIONS

Thank you for you interest in participation in this research study.

To be sure that you qualify for the study and that you understand the process, I would like to ask you a few additional questions before we can move forward.

a) Are you over 60 year of age?
b) Have you participated in a martial arts program in the past 10 years?
c) Are you willing to provide a medical clearance and health history form?
d) Are you willing to participate in a 12-week program that occurs 2 times per week and attend all classes for a total of 24 classes?
e) Are you available at the time the classes are offered?
f) Do you understand that this class is for research purposes?
g) Do you understand that this includes low to moderate exercise?

Do you have any questions for me about the study or your involvement in this research?

The classes will begin on _____ . Please be sure to return the medical form and the consent forms as soon as possible as we can go proceeded further without the forms.

The center will call you one week prior to the start of the class to schedule a pre test and to remind you of the session start date. Please wear loose fitting clothing and be sure to bring any assistive devices to class that you may need. Also be sure to bring water to each session.

Thank you for your interest/participation if you have any further questions I can be reached at 408-482-4961 or Jennifer.schachner@sjsu.edu

Have a wonderful day and see you soon.

APPENDIX B

HEALTH HISTORY AND SCREENING FORM

This is your medical history form, to be completed prior to your first assessment. All information will be kept confidential. This information will be used for the evaluation of your health and readiness to begin our exercise program. The form is extensive, but please try to make it as accurate and complete as possible. Please take your time and complete it carefully and thoroughly, and then review it to be certain you have not left anything out.

Name: _____

Date: _____

HEALTH HISTORY AND SCREENING FORM

General Information

Participant:

Name _____

Address _____

Contact phone numbers _____

Birth date _____ (please include year)

Family Physician and/or Primary Health Care Provider:

Doctor/Other _____ Phone _____

Address _____ City _____

Present Medical History

Have you ever been told by a doctor or another health professional that you have had any of the following condition? (Mark all that apply.)

- ☐ Arthritis
- ☐ Rhumatic disease
- ☐ Cancer
- ☐ Daibetes
- ☐ Depression
- ☐ Heart Disease
- ☐ Hypertension (high blood pressure)
- ☐ Lung disease or breathing problems
- ☐ Alzheimer's Disease
- ☐ Glaucoma

Do you have a history of any of the following?

- ☐ Artificail joint?
  Where_____
- ☐ Back problems
- ☐ Chest pain/angina
- ☐ High cholesterol
- ☐ Congestive heart failure
- ☐ Unexplained dizziness
- ☐ Heart Attack
- ☐ Hernia
- ☐ Macular Degeneration
- ☐ Multiple sclerosis
- ☐ Osteoporosis
- ☐ Pacemaker
- ☐ Parkinson's
- ☐ Seizures
- ☐ Stroke
- ☐ Surgury in the past year?
  Date/Reason_____
  _____
- ☐ Wakness
- ☐ Unsteadyness
- ☐ Falls
- ☐ Anemia
- ☐ Thyroid problems
- ☐ Pneumonia
- ☐ Bronchitis
- ☐ Asthma

Self Assessment

Do you believe you are physically fit?

- ☐ Yes
- ☐ No

Can you stand up from a chair without using your arms?

- ☐ Yes
- ☐ No

Can you get up floor without assistance?

- ☐ Yes
- ☐ No

Can you stand on one leg wtihout support?

- ☐ Yes
- ☐ No

Can you walk up and down steps without using a handrail?

- ☐ Yes
- ☐ No

Can you walk around a city block without being short of breath?

- ☐ Yes
- ☐ No

What exercises do you currently do on a regular basis (if any)?

- ☐ Walk
- ☐ Row
- ☐ Yoga
- ☐ Bike
- ☐ Dance
- ☐ Swim
- ☐ Strech
- ☐ Tai-Chi
- ☐ Tennis
- ☐ Weights
- ☐ Aerobics
- ☐ Martial arts

How many days per week?: _____

Please answer the following:

List any prescription medications you are now taking: _____
_____
_____

List any self-prescribed medications, dietary supplements, or vitamins you are now taking:_____
_____
_____

List any allergies:_____
_____
_____

Other Heart Disease Risk Factors

Smoking

Have you ever smoked cigarettes, cigars or a pipe?

☐ Yes ☐ No

If you did or now smoke cigarettes, how many per day? _____ _____Age started

If you did or now smoke cigars, how many per day? _____ Age started_____

If you did or now smoke a pipe, how many pipefuls a day? _____ Age started _____

If you have stopped smoking, when was it? _____

If you now smoke, how long ago did you start? _____

EMERGENCY CONTACT

NAME_____

PHONE NUMBER_____

RELATION TO PARTICIPANT_____

Participant Signature:_____Date:_____

REVIEWED BY PI

Initial_____Date_____

Medical Clearance Form

Your patient _____ wishes to take part in a modified martial arts exercise program that will include pre and post fitness testing. The exercise program will include progressive resistance training, flexibility exercises, and a cardiovascular program; increasing in duration and intensity over time. It will consist of low to moderate intensity exercise. The fitness assessment will include measurements of flexibility, and muscular strength and endurance as well as a balance assessment.

This is a research study conducted by Jennifer Schachner for completion of her dissertation for the University of North Carolina at Greensboro. She can be contacted at 408-482-4961 or Jennifer.schachner@sjsu.edu.

By completing this form, you are not assuming any responsibility for our exercise and assessment program. Please identify any recommendations or restrictions for your patient's fitness program below (Physician's Recommendations).

Patient's Consent and Authorization

I consent to and authorize _____ to release to _____ , health information concerning my ability to participate in an exercise program and/or fitness assessment. I understand this consent is revocable except to the extent action has already been taken. Authorization is not valid beyond one year from date of signature. Further disclosure or release of my health information is prohibited without specific written consent of person to whom it pertains.

Member's signature	Date

Physician's Recommendations

	I am not aware of any contraindications toward participation in a fitness program.
	I believe the applicant can participate, but urge caution because:
	The applicant should not engage in the following activities:
	I recommend the applicant **not** participate in the above fitness program.

Physician's signature		Date
Physician's name (print)	Phone	Fax
Address	City	State & Zip

APPENDIX C

SELF-EFFICACY FOR EXERCISE SCALE

Self-efficacy For Exercise (SEE) Scale Subject #_____
How confident are you right now that you could exercise three times per week for 20 minutes if:

	Not Confident Very Confident										
1. The weather was bothering you	0	1	2	3	4	5	6	7	8	9	10
2. You were bored by the program or activity	0	1	2	3	4	5	6	7	8	9	10
3. You felt pain when exercising	0	1	2	3	4	5	6	7	8	9	10
4. You had to exercise alone	0	1	2	3	4	5	6	7	8	9	10
5. You did not enjoy it	0	1	2	3	4	5	6	7	8	9	10
6. You were too busy with other activities	0	1	2	3	4	5	6	7	8	9	10
7. You felt tired	0	1	2	3	4	5	6	7	8	9	10
8. You felt stressed	0	1	2	3	4	5	6	7	8	9	10
9. You felt depressed	0	1	2	3	4	5	6	7	8	9	10

APPENDIX D

POWERPOINT PRESENTATION

Modified Martial Arts for Older Adults

Jennifer Schachner
University of North Carolina at Greensboro
San Jose State University- Timpany Center of San Jose

Jennifer Schachner

- 28 years in Taekwondo with a 5th Dan Black Belt
- BA and MS in Kinesiology from San Jose State University
  - focus on older adult and adapted physical education
- ABD- University of North Carolina at Greensboro
- Multiple fitness certifications
  - Senior Fitness Specialist, Older Adult Specialist (ISSA)
  - ACE, AFAA
- Currently a Professor of Kinesiology at SJSU and Programs and Operations Director for a therapeutic recreation center catering to older adult and disability wellness (Timpany Center)

Older Adults

- Falls Prevention
  - Inactivity is the #1 risk factor for falls in older adults.
  - Due to decreases in balance and strength (Jones & Rose 2005, Payne & Issacs, 2016)
- Inactivity
  - 40% of older adults fail to meet recommended amounts of exercise (US Dept. Health & Human Services, 2008)
  - Older adults are the least active demographic in the US placing them at higher risk for disease and disability (Nelson, Rejeski, Blair, Duncan & Judge, 2007)

Older Adults

- Barriers to Inactivity are social, emotional, cognitive and physical in nature
- Older adults at risk for low self-efficacy
  - Increases in strength, agility, endurance and balance lead to higher quality of life

Martial Arts Benefits

- Increased Strength
- Increased endurance
- Increased agility
- Increased balance
- Increased self efficacy
- BUT- few studies look at these benefits over 60

Research Aim

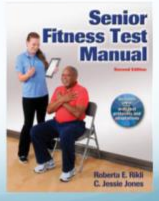
Determine the extent to which modified martial arts training improves older adult endurance, strength and balance, and self-efficacy.

Program Structure

- 12 weeks, 2x per week
- Pre and Post Test
- 55-60 minute class
  - 10 min. warm up/flexibility
  - 15 min. basic techniques
  - 10 min. pad conditioning
  - 15 min. Poomse (forms)
  - 10 min. cool down

Pre & Post Test

- Senior Fitness Test
- 8 foot Up & Go, Sit to Stand, Arm Curl, Step Test
- Self Efficacy
  - SEE
- Balance
  - 4-Point Balance test



8 Foot Up and Go

Sit to Stand

Arm Curl

Step Test

4 Point Balance

1. Parallel stance

Stand with your feet side by side. Time:

2. Semi-tandem stance

Place the instep of one foot so it is touching the big toe of the other foot. Time:

4 Point Balance

3. Tandem (Heel-Toe) stance

Place one foot in front of the other, heel touching toe. Time:

4. One-legged stance

Stand on one foot. Time:

SEE

Self-efficacy For Exercise (SEE) Scale Subject #_____

How confident are you right now that you could exercise three times per week for 20 minutes if:

	Not Confident Very Confident									
1. The weather was bothering you	0	1	2	3	4	5	6	7	8	9	10
2. You were bored by the program or activity	0	1	2	3	4	5	6	7	8	9	10
3. You felt pain when exercising	0	1	2	3	4	5	6	7	8	9	10
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- Resnick & Jenkins, 2000

Modifications

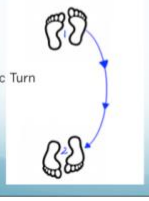
Punches

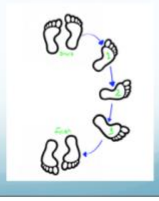
Blocks

Modifications

- Most students started from a chair
- Footwork big concern
  - No cross steps or slide steps

Basic Turn





Modified

Modifications

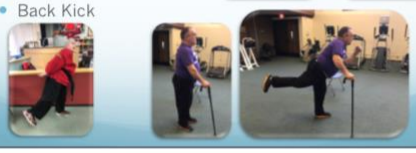
- Front Kick

- Side Kick

Modifications

- Round Kick

- Back Kick



Modifications- Poomse

Participant Journals

- 79 year old female
  - "I am not out of breath"
  - "Depression has improved"
  - More deep sleep
  - This class is fun without the plague of the workout
  - Appreciate the instructor to allow individual pace without ridicule
- 62 year old female
  - Well paced class working on both arms and legs-you really do an excellent job
  - I can now do 90 of the exercises without a chair
- 68 year old female
  - I could feel my body getting stronger and increased strength in both my legs and thighs.
- 60 year old female
  - I have less pain on the days I exercise Carole

71 year old female

- "Until enrolling in Jennifer's class, I had never felt safe while at the same time being determined to never be defined as a victim. Joining the class, for the first time, given me a sense of empowerment that I can defend myself and that I will never gain be silenced.
- It is my belief that every women or senior would benefit from this program physically, emotionally and socially.

Participant Description

- Participants
  - 18 completed all 12 weeks
  - 17 completed both pre and post (N=17)
  - 13 females, 5 males
  - Mean age 70.5 years (SD = 8.62)
  - 100 % retention rate
  - 89 % attendance rate

Results

Test	Pre	Post	T score	P value	Hedges g
8 foot Up & Go	10.83 (SD = 11.07)	7.04 (SD = 3.73)	9.79	P < .001	0.33 (small-medium)
Sit to Stand	10.23 (SD= 4.07)	13.94 (SD = 3.91)	5.5	P < .001	0.84 (Large)
Arm Curl	15.56 (SD= 29.44)	19.47 (SD= 4.74)	4.25	P < .001	0.95 (Large)
Step	53.89 (SD= 29.44)	75.82 (SD= 26.59)	3.26	P < .001	0.68 (Med-Large)
SEE	55.50 (SD= 20.94)	61.18 (SD = 20.13)	0.99	P < .001	0.29 (small)

Post Class Survey

1. Overall this class increased my knowledge.
2. Overall I enjoyed this class.
3. I now consider myself a martial artist
4. My individual needs were taken into consideration in this class.
5. I would recommend this class to others
6. Would you change any part of this program if offered again? If yes, which parts
7. If another class like this were offered, would you take it if there were no cost to you?
8. If another class like this was offered, would you take it if there was a small fee involved?
9. What do you feel was most helpful about this class?

Any other comments?

Conclusion

- Study suggested positive outcomes for older adults
- Demonstrated the benefits of the modifications
- Older adults can participate without injury
- Older adults enjoy this type of exercise
- This is a viable population for our training when there are modification.

Future

- Training seminars
- Instructor handbooks
- Certification processes
- Website and video access